

BIRDS OF THE LOWER FLORIDA KEYS

including the

GREAT WHITE HERON AND KEY WEST NATIONAL
WILDLIFE REFUGES

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Bird life on the Florida Keys has been studied for more than one hundred years. Ornithologists from the time of Audubon have made occasional trips to the keys, chiefly during the winter time, and have published reports on the birds they observed. A few students, especially in recent years, have also spent the summer months there and have made brief reports on their findings.

The author of this paper served as manager of the Great White Heron and Key West National Wildlife Refuges, for the Fish and Wildlife Service (formerly the Biological Survey), U. S. Department of the Interior, from February, 1939, until October, 1942. This assignment was to provide a resident protector for the fast diminishing Great White Herons, as the area constitutes their principal nesting grounds. The study and protection of this great bird was the writer's primary concern, but the undertaking also permitted observation of other interesting birds, and of the wildlife in general.

The Key West National Wildlife Refuge consists of keys or islands lying southwestwardly from the city of Key West, and was established on August 8, 1908, by Executive Order No. 923 of Theodore Roosevelt. The Great White Heron National Wildlife Refuge, consisting of those keys on the Gulf side of the main highway keys in lower Florida Bay, was established on October 27, 1938, by Executive Order No. 7993 of Franklin D. Roosevelt. For the sake of brevity they are called simply the Great White Heron and Key West Refuges in this paper.

In addition to the two refuges, the principal keys from Key West to Big Pine Key were under regular patrol and study. On Big Pine Key and a few others a small remnant of the Key deer survives.

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The plant life of these keys is semi-tropical and tropical, and on many of them (especially the island of Key West) a number of exotic plants abound, brought in over the years from many foreign ports, and making the area one of intense interest to botanists. Most of the keys are covered with a heavy growth of mangrove, including three species—the red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia nitida*), and white mangrove (*Laguncularia racemosa*). Many of the keys are partially submerged at high tide. A few have open areas and sandy beaches.

Although the area studied lacks numerous well known species of birds that are found farther north, and is not in the direct line of migration for many forms, those found here are of extreme interest, and some of them are not to be seen anywhere else in the United States. West Indian forms of tropical affinities, as well as wintering birds of western distribution, add to the ornithological interest of the region.

The names of Audubon, Maynard, Atkins, Holt, Bent, Chapman, Howell and others are closely associated with the ornithology of the keys. A house is still standing (1942) in Key West which is said to have been occupied in 1832 by Audubon.

No attempt is made in this paper to present a complete account of the ornithology of the Florida keys; it is simply a report on some of the observations and collections made by the author during the approximately three and one-half years during which he was manager of the two refuges.

Many ornithologists and bird students from various parts of the United States have visited these refuges and contributed valuable information and advice to the writer. In addition, a number of local residents were of great assistance and influence in the protection of wildlife. To all of these, grateful acknowledgement and thanks are extended.

Special credit must be given to the following: Stephen C. Singleton, Secretary of the Key West Chamber of Commerce, for much useful information about the keys, and for exerting his influence toward the protection of all wildlife; John H. Davis, Jr., for identification of much of the flora of the keys; Augustus S. Houghton of New York City and Coconut Grove, Florida, for information and companionship on many trips; Mr. and Mrs. Earl Sycks for the use of their botanical garden on Stock Island

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Joseph E. Warren of Key West, a faithful patrolman, was the author's companion on most of the many trips made throughout the area. Miss Harriet Stokes typed the manuscript of this paper, and Miss Susebel Bridges aided in checking and copying the final draft. The services of Miss Stokes were lent, at the suggestion of Dr. James Nelson Gowanloch, by the Louisiana Department of Conservation. To all of these thanks are extended for the assistance rendered.

The nomenclature used is that of the Fourth American Ornithologists' Union Checklist (1931), except in the instance of the Athens Yellowthroat (*Geothlypis trichas typhicola*), which was not described until 1934.

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ANNOTATED LIST

COMMON LOON

Gavia immer immer (Brunnich)

A winter resident in this area, occurring in December, January, February, and March. December 25, 1939, earliest, and March 18, 1941, latest, date seen. On January 30, 1940, twenty-nine loons were observed in the waters between Key West and Sand Key. Oil-soaked or injured individuals were frequently noted.

HORNED GREBE

Colymbus auritus Linnaeus

An uncommon winter resident in these waters. My only records are as follows: On February 10, 1940, one bird was observed off Sugarloaf Key in the waters of the Atlantic; on January 7, 1941, one was seen off Fleming Key near Key West.

PIED-BILLED GREBE

Podilymbus podiceps podiceps (Linnaeus)

A winter resident, inhabiting the small ponds and ditches along the lower keys. My earliest note of arrival is November 17, 1941, and the latest date on which it was seen is March 18, 1941. All of the rather frequent observations have been of single birds or of two at the most. Key West, Stock Island, Boca Chica Key, Geigers Key, Sugarloaf Key, and Big Pine Key all harbor a few individuals of this species during the winter months.

EASTERN BROWN PELICAN

Pelecanus occidentalis occidentalis Linnaeus

A permanent resident among the keys, more abundant during the winter months when its numbers are augmented by birds from farther north. Pelicans are seen throughout both refuges and south to the Marquesas Keys; they are common around the docks and piers of Key West, where they are fed by fishermen and tourists. At one dock, when the fishing boats arrive in port, they mingle with cats and dogs, which have a healthy respect for their huge beaks.



On July 2, 1940, a nesting site was located on a small key off the Gulf side of Sugarloaf Key. Eleven nests were counted, most of them in a dilapidated condition as the young had left, although fifteen immature birds were counted on the limbs and branches of the mangrove trees. One nest contained two eggs. Many dead small fishes were found in the water below the nests.

An interesting and rather amusing incident was noted off South Beach, Key West, on an August day. A pelican, intent only on its fishing, was pursued by a laughing gull. The pelican would dive into the water for the fish, and when it came up the gull would alight on it, generally on its back. I thought at first that the gull would grab at whatever fish the pelican tried to swallow, but apparently this was not the idea. Each time the pelican flew about, the gull would follow and light on its back for a few seconds or minutes, apparently for the ride. This performance did not seem to worry the pelican at all, as it kept right along in its search for food.

WHITE-BELLIED BOOBY

Sula leucogaster leucogaster (Boddaert)

The following are my only records: October 12, 1939, one was seen on buoy No. 8, and one more on another buoy nearer Sand Key, between Key West and Sand Key a few miles off Key West; July 30, 1940, one bird on a marker near Fort Jefferson, Dry Tortugas. This last location is about 65 miles west of Key West.

GANNET

Moris bassana (Linnaeus)

Although undoubtedly occurring in numbers offshore at times during the winter months, my only record is of nine birds (apparently one adult and eight in immature plumage) seen from Key West on December 29, 1941. They were flying a little above the water in a southwesterly direction toward the Key West Refuge. A rather strong "norther" which had blown all night was continuing during this day.

FLORIDA CORMORANT

Phalacrocorax auritus floridanus (Audubon)

Permanent residents among the keys, "nigger geese" are common on the channel markers and on a number of the keys of both

refuges, as well as about the ponds of Key West and the main highway keys extending to the mainland of Florida.

Cottrell Key in the Key West Refuge has supported a rookery for many years. On March 5, 1941, this was visited by the writer and Joe Warren, his boatman. About 200 birds were flying about as we approached from Northwest Channel, and as we came alongside many young of the year flew off their nests to the water, apparently having left the nest only recently or perhaps taking off for the first time. From 50 to 100 nests were located in the mangrove trees near and over the water, about 90 per cent of them empty, although they had been used that year. A few young, probably unable to fly, remained on the nests. All of these nests were on the side of the key away from the open waters of the Gulf.

Several thousand cormorants use the keys and waters of the refuges. It is presumed that many of the birds seen during the winter months are of the double-crested form, *P. a. auritus*, although specimens are lacking to verify this.

MAN-O'-WAR-BIRD

Fregata magnificens Mathews

The keys offer a rare opportunity to witness this wonderful flier at its best. There is always a thrill in seeing one of these birds sweep down from high in the air to pick up some morsel of food from the surface of the water. Although frigate birds may be seen on several keys in some numbers, one need go no farther than one of the docks or piers of Key West to observe them; often several may be seen perching on the roof of some old building for a few minutes before taking to the air again. They never rest upon nor dive beneath the water, but scoop up their food from the surface by expert maneuvering. As predators, they will chase a tern, if necessary for miles, to make it drop its food, which is caught by the frigate bird before it reaches the water. I suspect them strongly of breaking up nests of herons by stealing the eggs, although I have not yet seen this happen.

Only occasionally did I see individuals with inflated throat pouches—a remarkable sight, as they fly overhead or against some dark mangrove, the pouch appearing like a toy balloon or reddish-glowing lantern.

Man-o'-war-birds are seen during every month of the year; many are in immature plumage, but no nests have yet been found in the Florida keys.

GREAT WHITE HERON
Ardea occidentalis Audubon

Although this magnificent bird has been the subject of special study by the writer since February, 1939, and its protection was one of the chief reasons for his transfer to this area, it is not proposed to give a complete life history in the present paper but to leave fuller consideration to a subsequent article.

Suffice it to say that market hunters, "egggers," and especially the hurricane of 1935 brought this species to the verge of extinction. In October of that year Alexander Sprunt, Jr., of the National Audubon Society, as a result of counts and a close estimate, could report only 146 birds in nine-tenths of their range.

During the time I was stationed at Key West—February, 1939, to October, 1942—I made many trips by boat throughout the area from Noname Key to the Marquesas Keys, as well as by car and on foot on the keys traversed by the Overseas Highway, so that fairly accurate counts of this great bird were made over most of its habitat. Using a Coast Guard plane, one inspection flight was made from Miami to the Marquesas and return, and another from Miami over much of the lower Everglades and Cape Sable country. However, the area comprising the Great White Heron and Key West Refuges was the one under constant patrol, and by far the greater part of my notes were made there and along the rest of the lower keys. Information was kindly furnished by other observers as to the status of the Great White Heron among the upper keys from the Matecumbes to the mainland.

Owing to shallow water over most of the area and changes due to tides, and to the difficult flats, marshes, and mangrove jungles, the territory was an extremely hard one to work. The millions of mosquitoes and other insect pests, the tropical sun, and considerable stormy weather were further handicaps to study of the area. Despite these factors, however, the search for information on this and other birds was extremely interesting and the results obtained were well worth the effort.

As a result of continual protection and patrolling, as well as of educational efforts in Key West and on the other keys, by the

fall of 1942 the Great White Heron population had increased to approximately 1,500 to 1,800 birds. Some arrests for refuge violations were made during this four-year period, and probably some birds were killed that the writer never learned about.

It is not believed that the race is very prolific, and as it is restricted in its distribution to the mangrove keys and interbreeds with the Ward's Heron (*Ardea herodias wardi*), its increase is slow. There is the possibility also that mating with Ward's, producing the hybrid, Wurdemann's Heron (*Ardea wurdemannii*), may in time completely eliminate the pure strain of the Great White. At the present time, however, this possibility seems remote.

Nests containing eggs and young were found on many keys, including Snipe, Round, Scott's, Harbor, Bill, Big Crane, Cottrell (Key West Refuge), Little Crane, Pass (off Sugarloaf), and the Bay Keys. Nesting results were extremely favorable on Crane, Snipe, and the Bay Keys where intensive studies were made.

Eggs or young were found in the nests during the months of November, December, January, February, March, and April. All nests were bulky affairs made chiefly of mangrove sticks, generally with a few leaves for lining, and hardly different from those of the Ward's Heron. As the eggs also are of practically the same size and color, determination of the ownership of nests was at times difficult. The majority of the nests were from four to fifteen feet above ground or water.

Outstanding population counts may be summarized as follows:

1939—March 10 (with Harold S. Peters), 55 birds on a trip from Key West to Snipe Keys; March 13, 93 or more birds, the Marquesas Keys; March 16, 40 birds, about Fleming, Johnston, Michael, Budd, Raccoon, Mayo, and Little Pine Keys; May 5, 30 birds, on trip Noname to Key West; May 11, 67 birds, the Marquesas; August 7, 68 birds, the Marquesas; December 14, 74 birds, Marquesas.

1940—October 21, 33 birds, Mud, Eagle Nest, and Harbor Keys, and Calda Channel; November 6, 55 birds along Calda Channel, a favorite feeding place at low tide; 31 near Bay Keys; December 30, 31 birds, Calda Channel, Harbor, Mud, and Snipe Keys.

1941—January 7, 31 birds, Bay, Harbor, Snipe, Annette, Johnston, Torch, and Water Keys; February 26 (with Harold S. Peters in Coast Guard plane from Miami over many of the keys to Key West and the Marquesas and return, four and one-half hours), my count 303 birds, Peters' count 516; February 27 (with Peters and Jay V. Kelsey in Coast Guard plane from Miami to Cape Sable, Whitewater Bay, Card Sound,



Fig. 2.—Great White Heron. Great White Heron National Wildlife Refuge, Key West, Florida.
Photograph by Howe Sadler, April 22, 1942, for the Fish and Wildlife Service.



Fig. 3.—Great White Heron (not fully mature). Big Crane Key, Florida. Photograph by Earle R. Greene, January 23, 1941, for the Fish and Wildlife Service.

Barnes Sound, Flamingo and other keys off mainland), Kelsey, one side of plane, 16 birds, my count, other side, 38 birds, Peters in front with pilot, 35 birds; April 17, 85 birds, Marquesas (Joe E. Warren); December 26, 52 birds, on a circuit of Bay, Cayo Agua, Harbor, Eaglenest, Snipe, Mud, Harbor, and Bay Keys, Calda Channel, Boca Chica, and Key West.

1942—January 16, 48 birds feeding out from Crane Key; February 6, 93 birds, on a trip from Bay to Noname Keys; July 23, 45 birds, Marquesas Keys (Joe E. Warren).

Mention might be made also of records by the author of Great White Herons seen at some distance from the refuge area: April 18, 1939, one bird near the Tamiami Trail about 14 miles west of the road southward to Homestead; and July 18, 1939, one bird over the Indian River at Jensen, Martin County, Florida. On March 17, 1941, Mr. Brinson of the National Park Service told me that one Great White Heron had been seen recently on Bush Key in the Dry Tortugas.

Some of the many nesting records follow:

1939—Snipe Keys: February 20, 1 nest containing 2 eggs, 1 with 1 egg and 1 young bird, 1 containing 2 young birds, both of which snapped and squawked at me, 2 nests unfinished, 1 containing 1 white, and 1 dark-brownish bird, both almost grown, that were tame and showed no fight (see also under Wurdemann's); March 7, same nest as on February 20, containing 1 Great White and 1 Wurdemann's immatures, both birds getting off nest on our approach, thus being considerably more active than before. "Wurdy" went back to the nest but "Whitey" stayed off while we were in that vicinity. November 8, Scotts Key: 1 nest containing 3 eggs, either Great White or Ward's. November 10, Snipe Keys: 3 nests containing 3 eggs each (Great White or Ward's). December 10, Snipe Keys (see also December 5, Ward's): 2 nests containing 3 young birds each, 1 with 2 young and 1 egg, 1 containing 1 young and 2 eggs. December 28, Snipe Keys: 1 nest, possibly Ward's, containing 4 eggs.

1940—January 11, Scott's Key: 1 nest containing 2 birds and 2 eggs (Warren), and 1 with 2 eggs. January 31, Snipe Keys: 1 nest contained 1 egg, 2 with 4 eggs each, 3 having 2 birds each and 1 with 3 birds (all reported by Warren). February 2, Snipe Keys: 1 nest with 4 eggs, 1 with 2 eggs; 1 with 2 Great White young, and 1 with 3 eggs. March 12, Snipe Keys: 1 nest with 2 very young with white down, 1 contained 1 egg and 1 downy young, 1 nest had 3 downy young. (Young of the Great White can always be told from those of Ward's Heron by their white plumage). December 10, Houghton Key of the Snipe Keys: 2 nests with 4 eggs, 2 with 3 eggs, 3 with 2 eggs, 1 with 1 egg; December 18, one of same nests, containing 4 eggs as reported December 10; December 30, all nests empty, apparently deserted (possibly due to intruders).

1941—January 8, Bill Key off Torch Key: 1 nest with 1 young bird that walked off nest at our approach, 1 nest had 3 eggs, and about 6

nests were unoccupied. January 23, Big Crane Key: 2 nests with 1 young each, and 2 with 3 eggs each. March 5, Cottrell Key: 1 nest containing 2 young and 2 eggs. March 12, Crane Key: 1 nest with 1 young, 1 with 2 young, and 7 empty. April 4, Houghton Key of the Snipe Keys: 1 nest with 1 young and 1 egg, 1 with 1 young (Great White) and 1 larger, gray (Wurdemann's—"Wurdy" climbed out of nest), 1 nest with 1 young gray (Ward's or Wurdemann's), 1 with 3 eggs, 1 with 2 eggs. April 18, Marquesas Keys: 7 nests containing 2 small birds each (Warren). November 19, Houghton of Snipe Keys: 1 nest with 4 eggs (possibly Ward's Heron), 1 nest having 4 eggs, 3 nests with 3 eggs each, 1 with 1 egg, 2 containing 2 young and 1 egg each. Pass Key off Sugarloaf: Nest containing 4 birds (2 well grown, 1 medium size, and 1 small). November 24, Bay Key: 1 nest containing 2 young and 2 eggs. December 10, Houghton of Snipe Keys: 1 nest with 1 small bird and 3 eggs, 1 nest having 3 eggs, reported by Warren.

1942—January 15, Crane Key: 1 nest containing 1 pure white bird and 1 gray bird (Wurdemann's; the white was more advanced and climbed away from nest), 3 nests with 2 birds each, 2 having 1 bird each, 1 nest holding 2 birds and 1 egg, 1 containing 1 dead bird, 1 with 2 birds (1 dead). One Great White flew off the key and alighted, floating on the water, then walked to land—an unusually tame young bird. February 12, Big Crane Key: 5 nests containing 1 egg each, 2 with 2 eggs each (Warren). Little Crane Key: 1 nest with 3 eggs, and 1 with 1 egg (Warren). April 7, Bay Key: 1 nest, No. 1, about 15 feet up in a buttonwood tree, containing 2 eggs; another, nest No. 2, with 3 eggs; April 14, nest No. 2, 3 eggs still in nest. On Perret of Bay Keys: 1 nest with 1 egg, 1 having 2 small birds and 2 eggs, 1 with 3 eggs, 1 containing 2 well-developed young. On Bay Key, nest No. 2 on April 21 held 1 young just hatched and squawking, plus 2 eggs. April 22, Perret Key: nest containing 2 young and 1 egg, 2 with 2 young, 1 containing 3 eggs, 1 with 3 birds and 1 smaller "runt" on ground which we replaced in the nest.

Number of broods per year—The finding on January 8, 1941, of a nest containing 3 eggs on Bill Key and the broken shells of 2 or 3 eggs directly underneath suggests that more than one brood may sometimes be reared.

Mating—On March 20, 1942, off Scott's Key, an adult Great White Heron was observed chasing an adult Ward's Heron, the Ward's apparently leading the white one on, stopping on a sandbar then again flying a short distance.

Feeding areas—A number were favored, one of the most noticeable being along Calda Channel off Key West when the tide was low and much of the area became dry. At such times dozens of birds could be seen wading about and feeding as well as perching



Fig. 4.—Eggs and nest of Great White Heron. Snipe Keys, Florida.
Photograph by Harold S. Peters, March 10, 1939.



Fig. 5.—Immature Great White and Wurdemann's Herons at nest.
Snipe Keys, Florida. Photograph by Harold S. Peters,
March 10, 1939.



Fig. 6.—Nest and four eggs of Great White Heron. Snipe Keys, Florida.
Photograph by Maurice Broun, January 31, 1940.



Fig. 7.—Great White Heron on nest. Great White Heron National Wildlife Refuge,
Key West, Florida. Photograph by G. Edgar Folk, Jr.

on the channel markers. At high tide the birds made for the mangrove jungles of the keys.

Food—Although small fishes and other aquatic organisms are known to be the usual food of these herons, I saw some evidence that snakes may at times be taken. On June 23, 1939, a bird was closely watched on Trumbo Island, a part of Key West. It had a long snake, species unknown, which it almost completely swallowed before I left the scene. Again, on September 21, 1942, I was told by a reliable person in Key West that she had recently seen a Great White Heron, standing near the Casa Marina Hotel, with a live black snake wrapped about its neck. The bird was apparently making efforts to extricate itself from the coils of the snake, and when she approached it took wing with the snake hanging on. Probably the bird had caught the snake for food but was having a hard time subduing it.

Abnormalities—A number of birds with oil on their plumage were seen. Some of this probably originated in refuse from a dumping area. Great White Herons with blackish spots on the breast, sides and wings attracted attention and were commented upon by many people. At times unable to fly, they appeared to seek the aid of man, as a number of birds came to house yards and one even to a business establishment—appropriately enough, the city laundry! Occasional dead adults and a few dead young birds were noted. On one occasion two birds, apparently adults, with the breasts destroyed, were found lying in a nest, their feathers on the ground. The agent responsible was not determined.

Tameness—Instances of unusual tameness on the part of these birds were noted, although it must be stated that as a rule the Great Whites are much wilder than the Ward's Herons. One bird for many weeks frequented the dock area about Lowes Fish Market, and partook of the fishes discarded by incoming fishermen; several Ward's Herons behaved likewise. The Great White would approach to seize fish tossed to it on the dock, although it seemed to measure the distance between itself and its benefactor. Several people made good photographs at close range—20 feet or possibly less.

WARD'S HERON

Ardea herodias wardi Ridgway

This, the Florida representative of the Great Blue Heron, is a permanent resident among the keys and a common sight on the sandbars and lagoons along the Overseas Highway. As a rule, it is much more approachable than is the Great White Heron.

The relationship of this race to the Great White Heron, a subject of much discussion over a number of years, appears to have been settled; I shall therefore deal with other topics, accepting in that respect the findings of A. C. Bent, E. G. Holt, and Arthur Howell.

Ward's Heron occurs throughout the area of the two refuges and the other lower Florida keys, and at times is abundant. A few of the many counts made are here recorded:

1939—March 13, 9 birds, one of which appeared to be a Wurdemann's, were seen from a distance about the Marquesas Keys, the western extremity of the Key West Refuge. March 22, 18 birds were noted about the Bay Keys in Great White Heron Refuge. Scattered birds were seen throughout the length of the refuges at all seasons of the year.

1940—February 23, 13 birds, and May 15, 9 birds, about the Snipe Keys. October 21, 1 off Eaglenest, 1 off Mud Keys, 5 off Harbor Keys, 9 off Calda Channel, feeding. November 6, 20 birds along Calda Channel at low tide, feeding. December 10, 16 birds at Snipe Keys.

1941—December 26, 35 birds, 1 juvenile, Bay Keys.

1942—May 18, about Mule, Archer, Mullet, Womans, Man, Barracuda, and Boca Grande Keys, a total of 34 birds was counted by Joe E. Warren.

Nests, Eggs and Young—Many nests, eggs, and young were inspected during the period, some of which are listed here:

1939—February 20, Snipe Keys: 1 nest containing 2 eggs, 1 nest with 1 egg and 1 young, 1 holding 2 young birds (both at the snapping and grunting age), 2 nests unfinished, 1 containing 1 white and 1 dark bird, almost grown, that were very tame and showed no fight. (These nests were all either Ward's or Great White. See also March 7, under Great White and Wurdemann's herons). March 10, Snipe Keys: 1 nest containing 2 Ward's or Wurdemann's young, another with a similar brood (Peters), 1 containing 3 eggs, 26 other nests reported by Peters and Warren. March 22, Bay Keys: 1 nest 2 young, and 1 with 1 young. November 10, Snipe Keys: 1 nest had 3 eggs, another with 3 eggs, 1 more with 3 eggs, and several nests in the making. (All these were apparently Great White or Ward's herons' nests, more of the former than the latter). December 5, Snipe Keys: Silver, Warren and the writer found: 1 nest containing 3 young, 1 with 1 large young and 2 eggs, 2 holding 2 birds



Fig. 8.—Ward's Heron. Trumbo Island, Key West, Florida.
Photograph by Earle R. Greene.



Fig. 9.—Ward's Heron (immature, on nest). Perret Key of the Bay Keys.
Photograph by Howe Sadler, April 22, 1942.



Fig. 10.—Reddish Egret (white phase).
Sugarloaf Key, Florida. Photograph by
C. Blackburn Miller, March 10, 1940.

and 1 egg each, 1 with 3 eggs, 5 new nests with no eggs or young as yet. December 28, Snipe Keys: 1 nest with 4 eggs was unusually large; it was about 5 feet above ground in mangrove, and made of heavy sticks with smaller sticks and leaves for lining (possibly Great White). There were also several empty nests.

1940—February 2, Snipe Key: 1 nest containing 2 young birds, 1 with 3 young. February 23, Snipe Key: 1 nest with young Ward's or Wurdemann's, almost grown, standing on top, 1 containing 1 egg and 2 dead young (apparently a Great White and Wurdemann's, cause of death undetermined—possibly cold weather). March 12, Snipe Key: 10 empty nests; 1 nest containing 1 Ward's or Wurdeman's, almost grown; 1 more nest holding 1 bird almost grown, Ward's or Wurdemann's, one dark dead bird on ground; 1 nest containing 2 birds, Ward's or Wurdemann's, almost grown; 1 with 2 Ward's, very dark, large, and on the verge of leaving nest.

1941—January 23, on small key off Blake Key: 1 nest containing 1 almost grown bird which climbed out of nest, fell down, then with help of its bill regained its footing. December 10, Snipe Keys: 2 nests with 1 young bird each reported by Warren.

1942—January 15, Crane Key: 1 bird on, and 1 off, nest, both well developed, that off the nest being almost full grown. March 10, Snipe Keys: 1 nest containing 3 eggs. March 20, off Scott's Key: 1 bird being chased by Great White (see under Great White). April 7, Bay Keys: 1 nest, No. 3, about 12 feet up, containing 2 birds, bowing and snapping toward me, possibly 2 weeks old. April 10, nest No. 3, Bay Keys: 2 young birds still on nest. April 14, Bay Keys, nest No. 3: 2 young on nest, larger than before, 1 of them striking out and uttering angry guttural notes, sounding almost like a young dog. On Perret of Bay Keys: 1 nest holding 1 young and 2 eggs; 1 containing 2 well developed young both striking out and uttering angry notes; 1 about 20 feet up, with 1 or more young. April 22, 1 nest, low (about 4 feet), containing 1 bird almost grown, striking out and uttering notes, Perret of Bay Keys. Nest about 10 feet up, and with 3 young birds (Sadler), Perret of Bay Keys. May 21, 1 young bird, almost grown and distinctly marked, standing on low nest, Perret Key of the Bay Keys (photographed by Sadler on April 22). Nest No. 3 on Warbler of the Bay Key group held 1 young bird, almost grown and standing up; no other young seen in this nest.

Feeding areas—These are the same as for the Great Whites with which the Ward's Herons mingle. Calda Channel at low tide is a favorite.

Habits—More fearless than the Great White. One well known individual, which stayed for many weeks about the end of Trumbo Island where much fishing was done, was in the habit of stealing from the catches as well as the bait of the fishermen, and had to be chased away from time to time. Several were seen

about Lowes and other fishing docks waiting for the daily catch of fish to arrive, when they got their share from fish tossed away.

WURDEMANN'S HERON

Ardea wurdemannii Baird

(=*Ardea occidentalis* Audubon \times *Ardea herodias wardi* Ridgway)

This hybrid between *occidentalis* and *herodias wardi* was frequently seen. Its status and relations to the other two herons have been the subject of much study and discussion, and the reader interested in this matter is referred to publications by Holt,¹ Bent,² Howell,³ and Chapman.⁴ The last-named authority states (*op. cit.*) that *wurdemannii* is intermediate between *occidentalis* and *wardi*, and is doubtless a hybrid between them. My own observations support most of the conclusions reached by these ornithologists, and in particular the view that Wurdemann's Heron is a hybrid between the other two.

Bent (*op. cit.*, p. 99) notes that hybrids between closely related species are fertile and may interbreed with pure-blooded birds of either parent stock. A number of the herons which I saw in the lower keys were neither definitely dark like a typical Ward's Heron, nor as white in certain areas of the plumage as Wurdemann's is supposed to be; they had dark or blackish markings on the crown. Judging from the genetic behavior of other organisms, such individuals might result from back-crossing of Wurdemann's with Ward's Heron, or be the darker individuals of a variable F₂ generation produced by a pair of Wurdemann's Herons. Perhaps such atypical birds may originate in both ways.

My records of Wurdemann's Heron are for the lower keys from the Bahia Honda bridge to the Marquesas. These keys are

¹Holt, Ernest G. 1928. The status of the Great White Heron (*Ardea occidentalis* Audubon) and Wurdemann's Heron (*Ardea wurdemannii* Baird). The Crile Florida Expedition, 1923-1924. *Sci. Publ. Cleveland Mus. Nat. Hist.*, 1 (1): 1-35, pls. i-vi. Cleveland, Ohio.

²Bent, Arthur C. 1926. Life Histories of North American Marsh Birds. *U. S. Nat. Mus. Bull.*, No. 135. Washington, D. C.

³Howell, Arthur H. 1932. *Florida Bird Life*. Published by the Florida Dept. Game and Fresh Water Fish, in coop. with Bur. Biol. Surv., U. S. Dept. Agr. (Coward-McCann Co., Inc.). New York.

⁴Chapman, Frank M. 1932. Handbook of Birds of Eastern North America. (D. Appleton Century Co., Inc.). New York and London.

of coral formation, and most of them are thickly covered with red and black (and a few white) mangroves. The bases of many of the keys are submerged at high tide, while others, larger and older, have sandy beaches and dry soil, and even some open grassy areas. The Great White Heron Refuge includes much shallow water, which at times is impossible to navigate. The Key West Refuge also is very shallow in parts, but includes some areas of deeper water.

For a time after my arrival I called all dark herons Ward's, and the others with whiter heads and other light areas of plumage Wurdemann's. However, on finding a number of intermediates, I realized that there must be considerable mixing. As many observations were made from a distance and from boats, the exact status of many of the birds seen could not be determined. Often, however, a bird with a white head and other light areas stood out distinctly from its darker companions. Sometimes there appeared to be more Wurdemann's than the darker Ward's Herons. One bird seen at Big Pine Key, near the northern extremity of the Great White Heron Refuge, had a white head and neck, and much of the wing was light-colored. On March 10, 1939, nine herons, one definitely Wurdemann's, were seen at the Marquesas. All types were seen throughout the refuge area. On February 2, 1940, at Snipe Keys, more of the Wurdemann's type were observed than of birds that could be definitely identified as Ward's Herons; and in April, June, and November, five or six light-colored birds were seen feeding at times along Calda Channel. On December 26, 1941, eight Wurdemann's Herons were counted on the Christmas Bird Census. In 1942 scattered individuals of this hybrid were recorded throughout the area.

Nests of special interest were found and recorded as follows:

1939—February 20: A nest on one of the Snipe Keys, in a mangrove, containing 1 white and 1 dark bird, both almost fully grown and very tame. March 7, same nest: the birds were more active than before, getting off the nest at our approach; the Wurdemann's went back into the nest when Warren came closer, but the Great White stayed nearby. March 10, same nest: both birds left, "Wurdy" coming back, but we were unable to get "Whitey" to return.

1940—March 12, on one of the Snipe Keys: A nest containing 1 young great white and 1 dark bird, both well grown; the "Wurdy," further advanced, left the nest.

1941—April 4, on Houghton Key of the Snipe Keys: A nest containing

1 small great white and 1 larger gray Wurdemann's; the latter climbed out of nest. In this nest there was part of a fish, possibly a mullet.

1942—January 15, on Crane Key: A nest contained 1 pure white and 1 gray bird; both were almost grown, but the white one was more advanced and climbed away from the nest.

AMERICAN EGRET

Casmerodius albus egretta (Gmelin)

Occasionally seen but not common on the lower keys, and apparently does not breed here. Single birds have been seen on Key West and on Boca Chica and Saddlebunch Keys, and as many as four were observed feeding along Calda Channel between Key West and the open waters of the Gulf. My records are from August 5 to March 30.

SNOWY EGRET

Egretta thula thula (Molina)

Apparently does not breed on the lower keys and is not at all common. One or two birds may be seen at almost any time of the year, however, and on May 3, 1940, eight were noted about a small pond on the island of Key West.

REDDISH EGRET

Dichromanassa rufescens rufescens (Gmelin)

On the verge of extinction in Florida, from reports along the keys it is apparent that this species may be increasing again. On May 21, 1939, one was shown to me by Ed Moore, representative of the Audubon Society in Key West at that time, and was again examined by Moore, Alexander Sprunt, Jr., of the Audubon Society, and me on the next day. It proved to be an immature in the white phase, and stayed about the ponds of Key West for some time, being seen on May 24, August 5 and 23, October 8, 11, and 18. On the 18th of October, a bird in the dark phase, either an immature or molting adult, also was seen at the same location. Again on February 24, 1940, a white individual, possibly the same one formerly seen, was observed near a pond on Key West. Also on June 7 of that year a white bird was noted. On June 25, 1940, the Kramers and Newmans of Philadelphia, enthusiastic bird students, came to my home to get me to see a bird new to them,

which proved to be a Reddish Egret, dark phase, at a nearby pond. These are all of the records of this species about Key West, but it is hoped that further investigation will show it to be on the increase here as well as throughout the state.

LOUISIANA HERON

Hydranassa tricolor ruficollis (Gosse)

The most abundant member of its family among the lower keys; a permanent resident, nesting on many of both refuges, and seen commonly about the ponds and bays of Key West.

On April 11, 1940, on a small key located between Torch and Raccoon Keys, 37 nests were counted by Joe Warren and the writer. One nest contained 4 eggs, 23 contained 3 eggs, 6 contained 2 eggs, 4 contained only one egg each, and 3 nests were empty. Several broken eggs were found on the ground and among the bushes—the work, it is believed, of a fish crow which stayed about the key. This small key we named "Louisiana Key" on account of the abundance of the Louisiana Heron on it. On April 24 of the same year, 18 nests were found on the same key (possibly some were recounted); 17 of these contained 3 eggs each, and 1 nest had only a single egg. Many young were observed here during the summer.

Numbers of Louisiana Herons come to the small ponds about Key West to feed, including both adults and young; 25 to 30 were often seen at one time.

LITTLE BLUE HERON

Florida caerulea caerulea (Linnaeus)

A permanent resident in the keys and fairly common, although it cannot be classed as abundant. Recorded from Noname Key to the Marquesas. As many as 30 were seen on Sugarloaf Key on February 16, 1940.

Nests with eggs and young were found on Johnston Key on April 10, 1940, and a nest with one young bird on July 23, 1940.

EASTERN GREEN HERON

Butorides virescens virescens (Linnaeus)

A common summer resident. A few winter in the keys, which makes it hard to determine dates of arrival and departure of the

migrants. Rather solitary in habits, and rarely seen in groups of more than three or four birds.

Nesting among the keys of the refuge. On May 15, 1940, a nest was located, made of small sticks about 10 feet up in a mangrove tree, containing 3 eggs, on one of the Snipe Keys. On July 2, 1940, a nest containing 1 young bird was found on a small key just off Sugarloaf Key. On July 23, 1940, a nest, made of small sticks, and located in a mangrove tree, contained 2 eggs, on one of the Snipe Keys. While I examined the nest, one of the adults stayed by, emitting notes like escaping steam.

One Green Heron was seen on Scott's Key on January 11, 1940, and one was found dead on the highway on Sugarloaf Key on December 6, 1940.

BLACK-CROWNED NIGHT HERON

Nycticorax nycticorax hoactli (Gmelin)

Apparently very scarce among the lower keys. My only record is of one adult and a bird in juvenile plumage on Bill Key near Torch Key on January 8, 1941.

YELLOW-CROWNED NIGHT HERON

Nyctanassa violacea violacea (Linnaeus)

A permanent resident among the keys and an abundant nester on many of them, ranging throughout the area to the Marquesas Keys, which are approximately 20 miles westward from Key West. Immature birds are frequently seen about the docks and piers of the city and are fairly approachable.

Nesting records for 1940 are as follows: April 4, Snipe Keys: 2 nests containing 1 egg each, 6 nests with 2 eggs each, 7 nests containing 3 eggs each, 3 nests new, with no eggs. Most of these nests were very close to the shoreline. April 10, Johnston Keys: 2 nests containing 2 eggs each, 1 with 3 eggs. April 11, on small key between Torch and Raccoon Keys, 2 nests containing 3 eggs each, and on another small key close by 1 nest with 2 eggs. April 12, on small key near Water and Howe Keys: 1 nest containing 4 eggs, 1 with 3 eggs, and 1 holding 2 eggs. On April 25 the small key of the Snipe Key group was again visited with the following results: 1 nest containing 1 young bird and 1 egg; 1 nest with 2 young, almost grown, one of which was just off

the nest; 1 nest holding 3 eggs; 2 nests with 2 eggs each; and 1 containing 2 young. On May 15, the same key was examined: 1 of the nests contained 3 downy young, 2 of them pecking at each other; another nest held 2 young. June 13, Riding Key: 1 nest containing 1 egg, 1 with 1 young bird, almost grown, and another nest with 1 young, almost grown. July 2, on a key just off Sugarloaf, a nest was found that contained 2 young birds.

On July 11, in the Upper Squashes, an immature Yellow-crown was seen swimming toward a small key. This bird was picked up and brought aboard for examination. When released it swam to one of the boat ropes dangling in the water and climbed up on it. We then placed it on the foredeck of the boat, where it appeared very confiding. Released again, it swam toward the key.

Among the 1941 records is a nest of 4 eggs on March 5 and another with 3 eggs on Cottrell Key in the Key West refuge.

An interesting and rather amusing incident was seen on July 5, 1942, at Bergdal's Camp on Boca Chica Key. An immature Yellow-crown, very tame and approachable, was seen standing on the shore and walking around looking for food. It would approach its objective, then stand, its neck swaying from side to side; then suddenly its bill would dart out impaling the prey. Its attention was attracted to two good-sized crabs, but they, seeing the heron, scurried into a hole. The heron stood waiting and watching for some minutes but finally gave up and walked away under the camp house.

EASTERN LEAST BITTERN

Ixobrychus exilis exilis (Gmelin)

Strange to say this little bird has evaded my observation with the exception of one adult brought to me by Joe Warren, our patrolman, on April 7, 1941. It had been found near one of the docks of Key West, and appeared unharmed although apparently dazed. It was turned loose, and slowly made away among the grasses and weeds about a pond in the city. On the same day, Charles Thompson saw one near his home in the city.

WOOD IBIS

Mycteria americana Linnaeus

Though common in many parts of the State, the only records I have for this area are of two which were seen from a Coast Guard plane on February 26, 1941, off Key Largo. On the next day, one bird was also spotted from the plane in the Cape Sable area.

EASTERN GLOSSY IBIS

Plegadis falcinellus falcinellus (Linnaeus)

On July 27, 1941, an adult was seen beside one of the small ponds on the island of Key West, in the company of several Louisiana and Green Herons. It stood for a time on one leg, then flew on my approach, alighting farther away.

WHITE IBIS

Guara alba (Linnaeus)

Rare among the keys, although at the Marquesas a few birds may occasionally be seen. On December 13, 1939, two birds were observed there, and on July 16, 1940, two were again seen at the same location. An immature individual, probably a wanderer, was noted near the Perky Camp on Sugarloaf Key, October 22, 1940.

ROSEATE SPOONBILL

Ajaia ajaja (Linnaeus)

Since Robert P. Allen of the Audubon Society has reported⁵ so admirably on the spoonbill colony near Tavernier, I give here only records of birds seen by me at other localities, mostly at the Marquesas or westernmost keys of the Key West Refuge, and about Key West.

On February 20, 1940, at the Marquesas Keys, one adult spoonbill flew directly over our skiff late in the afternoon. On July 16, the same year, one lit on the marl flat, Marquesas, and commenced feeding but flew on our approach. Later in the day four were

⁵Allen, Robert P. 1943. The Roseate Spoonbill. *National Audubon Society, Research Report*, No. 2.

seen by Joe Warren and the writer off Little Creek, near Eastern Harbor, Marquesas. One of these may have been the single bird seen before. On April 18, 1941, Joe Warren saw six at the Marquesas, and on June 18, the same year, I observed one in flight there.

Nests were not found by us on the Marquesas Keys, although it is believed they may be built there.

On July 25, 1942, one bird, apparently an adult, was seen feeding about a pond or watered area between Roosevelt Boulevard and my home in Key West. It was studied during two periods of the day, and when last seen was flying toward another pond. On subsequent occasions a single spoonbill (possibly the same individual) was seen feeding on the edge of this pond: on August 13, 1942, between 7:00 and 8:00 p. m., within 100 feet of the car from which I was watching; on August 14 at 8:30 p.m., August 15 at 8:00 p.m.; and on August 25 and 29, 1942.

GREATER SCAUP DUCK

Nyroca marila (Linnaeus)

On January 1, 1940, a female was closely observed near the highway off Long Key. Its size and other characteristics convinced me that it was this species. As it was not collected, however, the record is given for what it is worth.

LESSER SCAUP DUCK

Nyroca affinis (Eyton)

Ducks, with the exception of the mergansers, are scarce among the lower keys, although abundant in the Cape Sable area as well as many other parts of the State during the winter. Scarcity of proper food plants seems to be the chief reason.

The Lesser Scaup is seen occasionally during January and February. On January 15, 1941, twenty were observed on a small pond in Key West, where some of these birds stayed from January 10 until February 13; this number was the greatest recorded. On January 10, 1942, two birds, and on the 20th, three, all males, were in a small pond on the golf course on Stock Island, and a close view was had.

Natives of this area have told me of other locations where

ducks have been found, but visits to those places have been devoid of results.

AMERICAN MERGANSER

Mergus merganser americanus Cassin

Though undoubtedly rare in this area, eight birds of this species were identified by W. L. McAtee and the writer on December 23, 1941, near Eagle Nest Key in the Great White Heron Refuge. On December 26, 1941, during the Christmas Bird Count, 76 individuals were noted in the waters of the refuge off Key West.

RED-BREASTED MERGANSER

Mergus serrator Linnaeus

A winter resident in this area and the only duck commonly found here. It arrives about November 15, and stays through March and occasionally into early April, one bird having been seen on April 8 near the Mud Keys.

They are frequently observed about the small ponds of Key West and also just offshore, but the larger flocks are met with farther out in the Gulf waters of the refuge. On January 6, 1940, an estimated 300 to 500 were seen in one flock near Bay Keys. On January 16, 1941, a count of 275 birds in the refuge waters was made. Flocks numbering 100 to 150 were frequently seen.

TURKEY VULTURE

Cathartes aura septentrionalis Wied

A permanent resident among the keys, and seen along many of the Overseas Highway bridges. Sixty Turkey Vultures were counted over and about Key West on March 14, 1941. They are common at times about some of the keys of the Great White Heron Refuge, but appear to be scarce or absent from those of the Key West Refuge where the islands are scattered and the waters deeper, probably yielding much less food to their liking.

SWALLOW-TAILED KITE

Elanoides forficatus forficatus (Linnaeus)

The only records so far of this magnificent bird were made on Key Largo, just off the mainland of the State. On May 25,

1940, a Swallow-tailed Kite was seen just over the highway there, and one month later, June 25, the same individual or another was seen in almost the same location. On July 21, 1941, two birds were observed between the highway and the Anglers Club. No nest was found, although that key contains trees adapted for kite nesting. Probably the birds seen were hunting and had merely flown down from the mainland.

SHARP-SHINNED HAWK

Accipiter velox velox (Wilson)

The only definite records are as follows: March 8, 1939, one flying through the bushes near my home in Key West; March 31, 1940, a bird off Sugarloaf Key; and October 12, 1940, a dead Sharp-shin picked up in Key West. The species is doubtless more common during the winter and the migration period than these scanty data indicate.

COOPER'S HAWK

Accipiter cooperi (Bonaparte)

Records: September 14, 1939, a bird dashing about near my home in Key West; March 27, 1940, one in Key West; October 17, 1940, a bird about Boca Grande Key in the Key West Refuge; and October 29, 1940, one off Trumbo Island, Key West. Probably more common during the winter and migration season than the above data indicate.

FLORIDA RED-TAILED HAWK

Buteo borealis umbrinus Bangs

Apparently very scarce along the keys, my only record being of one flying and soaring in circles over Boca Grande Key of the Key West Refuge on October 7, 1941.

INSULAR RED-SHOULDERED HAWK

Buteo lineatus extimus Bangs

This form of Red-shouldered Hawk, which differs only slightly from the peninsular Florida form, is a permanent resident of the keys, and fairly common. At times it appears rather sluggish, tame and approachable, differing in this respect from the more northern forms. Sugarloaf and Big Pine Keys are the favorite localities in this area.

BROAD-WINGED HAWK

Buteo platypterus platypterus (Vieillot)

A winter resident and migrant in this area, October 10 to March 5. Fairly common and approachable; one bird (probably the same individual) remained for some time about the Casa Marina Hotel and West Martello Field where it could be closely studied.

SWAINSON'S HAWK

Buteo swainsoni Bonaparte

This western hawk winters almost every year in Key West and along some of the other lower Florida keys. I have observed it in Key West, on Stock Island, and on Sugarloaf and Noname Keys.

Those seen appeared to be of the light phase or possibly intergrades. They were very easily approached, and seemed tame or sluggish. One bird, in the top of a small tree, at the Botanical Garden on Stock Island, would not fly on a close approach until small objects were tossed toward it. At times a bird along the highway will fly from pole to pole in front of an approaching person or vehicle.

SHORT-TAILED HAWK

Buteo brachyurus Vieillot

I have only three records of this rare hawk in the area. On March 16, 1939, two birds in the white phase were seen soaring near Porpoise Key. On January 1, 1940, one individual of the dark phase was observed soaring near Key Largo, once diving for a short distance toward the earth. On October 17, 1940, one bird in the dark phase was seen at Boca Grande Key in the Key West Refuge.

SOUTHERN BALD EAGLE

Haliaeetus leucocephalus leucocephalus (Linnaeus)

Although not common along the lower keys, a few are occasionally seen—generally single birds, sometimes in pairs; dates of occurrence range from October through March.

Records have been made of Bald Eagles about Key West, Ramrod, Summerland, Saddlebunch, Torch, Snipe, Water, Cudjoe,

Porpoise, Lower Matecumbe, Key Largo, and Middle Torch Keys. No nests were located, although it is stated by natives that eagles nest in the area.

MARSH HAWK

Circus hudsonius (Linnaeus)

A common winter resident and migrant along the keys; first arrival noted October 5, 1940, Key West; last bird seen May 2, 1942, Boca Chica Key.

This hawk has been recorded on almost every key along the highway from Key West to the mainland, on Big Pine and Noname Keys, over many keys of the Great White Heron Refuge, and in the Key West Refuge to the Marquesas. About 18 were seen above Fort Taylor and the Navy Yard in Key West on November 3, 1939.

Although probably considered more beneficial than harmful throughout the country as a whole, it has been observed several times investigating bird-banding traps in Key West. On one occasion a Marsh Hawk was seen to grab a Mourning Dove through the bars of one of these traps, and on another trap in the same banding field a Marsh Hawk was seen plucking feathers from an undetermined bird, rising with the dead bird in its talons on my approach. Probably the concentration of doves and other birds on such a small area as this island makes easy feeding for predatory birds.

OSPREY

Pandion haliaetus carolinensis (Gmelin)

A permanent resident along the keys, nesting abundantly throughout the area to the Marquesas. Although the nests are generally near the top of a mangrove, the trees are short and the nests consequently close to the water, so that they may easily be investigated. Bird students and ornithologists visiting this area have been delighted with such close-up views, so seldom obtainable of nests in most northern localities.

The nesting season commences in November, during which month several nests containing fresh linings of leaves, seaweed, and grasses have been found. Egg laying and the raising of young birds continue through April and probably well into May, as a nest containing one egg was found on Bay Keys on April 22; this was empty on May 21. Several nests containing young birds

have been found in December. Thus the Osprey, like a number of other species, in this latitude has its chief breeding and nesting season during the winter months, much earlier than is characteristic of the same species farther north.

Two nesting sites unusual for this area were on a platform at the top of a tower on Blake Key, near the Snipe Keys of the Great White Heron Refuge, and on the upper part of a light beacon, just below the light, at Northwest Channel off Key West. The nest in the latter situation was composed of sticks, sponge, seaweed, rags, etc., and had been recently used when it was examined on February 18, 1942.

On September 2, 1942, when I arrived at my office in the Post Office Building in Key West I found a box containing an Osprey under my desk. The night watchman stated that it was found in the court of the building; it had apparently struck a wire during a storm. It was later released near one of the docks and flew rapidly away.

DUCK HAWK

Falco peregrinus anatum Bonaparte

A fairly common winter resident. The earliest arrival from the north noted was a bird seen September 14, 1941, on Sugarloaf Key; the latest date on which the species was seen was March 22, 1939, a single individual on Bay Keys.

In the Great White Heron Refuge the Duck Hawk has been noted about Bay, Big Crane, Snipe, and Little Pine Keys, and in the Key West Refuge on Boca Grande Key. Along the Overseas Highway it has been recorded on Boca Chica, Sugarloaf, and Big Pine Keys. Several are seen in Key West every winter.

On one occasion a peregrine was seen standing in the grass and weeds in a field near the Casa Marina Hotel in Key West, apparently looking for food. On another occasion one was observed in rapid flight, chasing shore birds near the salt ponds on Key West Island.

A Duck Hawk was seen near the Atlantic side of Boca Chica Key flying rapidly toward a flock of Black Skimmers, toward which it dived, but missed a kill.

In spite of the predatory habits of this bird, its every action creates a feeling of admiration and sometimes of awe, its fear-

lessness and boldness in attack adding greatly to the pleasure of bird study. After all it must eat to live, even if sometimes at the expense of some of our most charming birds.

EASTERN PIGEON HAWK

Falco columbarius columbarius Linnaeus

A fairly common winter resident, seen on dates ranging from September 23 to May 2. It has been noted in the Great White Heron Refuge near Scott's Key and off Trumbo Island, and in the Key West Refuge at Boca Grande Key. In addition birds have been seen in Key West and to the east about Boca Chica Key.

Although Pigeon Hawks are at times approachable, this is the exception rather than the rule. On April 23, 1940, one was closely observed on the ground and then on top of a nearby pole. Its markings appeared to be most nearly those of the western form, *F. c. bendirei*, which was recorded on the Tortugas Keys April 8, 1890, and on Key West October 27, 1896.⁶ However, the bird seen by me was not taken so there can be no certainty as to its race.

EASTERN SPARROW HAWK

Falco sparverius sparverius Linnaeus

LITTLE SPARROW HAWK

Falco sparverius paulus (Howe and King)

The Sparrow Hawk is by far our most abundant wintering hawk; the earliest date of arrival noted by me was September 25, 1941 (Key West), and the latest date of its stay was April 12, 1942 (Sugarloaf, Boca Chica, and Geigers Keys). Visiting bird students have counted them from the mainland to Key West, and found almost every key along the highway to harbor one or more birds. On December 21, 1939, I counted 24 in Key West proper.

Although the supply of suitable food is limited on the outer keys of the refuges, the Sparrow Hawk was seen on Howe Key of the Great White Heron Refuge and on Boca Grande Key of the Key West Refuge, both containing open areas well adapted to its use.

I have not attempted to differentiate between the two forms of this species, although at times differences in size may be noted

⁶Howell, A. H., *op. cit.*, p. 190.

in the field. Apparently both races are abundant in Key West and along the lower keys during the winter.

MANGROVE CLAPPER RAIL

Rallus longirostris insularum Brooks

Apparently a permanent resident, although seldom observed during the winter months. This is probably owing to its secretive nature, as well as to the fact that in winter the birds rarely utter the loud call notes so frequently heard during the rest of the year. Common on almost all of the keys from Key West to Big Pine Key, and on the outer keys to the Marquesas.

Several nests were found. One in Key West, just off the old County Road, was at the base of some mangrove bushes and built up a few inches. It contained 9 eggs on May 26, 1939. The adult female left the nest, and with much cackling feigned injury a few feet from me. This disturbance caused the adult male to appear, but for only a few seconds. While I stood very still by the nest the female walked almost silently about my feet and peered into the nest, on which she settled down. When I started away she left the nest again and appeared to be in a fighting mood, coming toward me.

On May 19, 1941, a nest containing 10 eggs was located on Cudjoe Key just off the highway, in a bunch of grasses by a small pond. This nest was inspected on three more occasions. On May 22 the female came off the nest uttering her cackling notes, and stayed close by as I photographed her and the nest. On May 25 an adult bird (whether male or female was not determined) acted differently; it slipped off quietly, and then jumped or flew toward me or the camera. The 10 eggs were still there, and a few minutes later the adult was back on the nest. On May 27 the nest was empty with broken shells outside; no signs of predators and no birds were found. I believe the eggs hatched out normally.

Young birds, in the black plumage, were observed running about on many occasions, generally with one or both adult birds close by. These young were seen during May, June, July, and August, although on August 12, 1942, those observed were much lighter in color and hard to tell from adults at a distance.

This rail is an excellent swimmer. At times it is very approachable, and since little has been written regarding the species, it would be an interesting subject for additional study.

PIPING PLOVER

Charadrius melodus Ord

A migrant and winter resident, although not common along the lower keys. Recorded dates range from August 24 to February 24; they were generally for single birds or twos and threes, and frequently in company with other shore birds.

CUBAN SNOWY PLOVER

Charadrius nivosus tenuirostris (Lawrence)

Although known to breed in Florida, this species appears to be scarce along the keys. Only one bird was seen, on March 8, 1940, beside one of the ponds in Key West.

SEMPALMATED PLOVER

Charadrius semipalmatus Bonaparte

This bird winters along the keys in some numbers, flocks of 40 to 50 often being seen. It frequents the keys of both refuges, especially where sandy beaches occur. Migrants arrive during August, although some of those seen were probably nonbreeding birds, which stay about most of the summer. Extreme dates are August 1, 1939, one bird, Key West, and April 25, 1939, eight birds on Boca Chica Key.

WILSON'S PLOVER

Pagolla wilsonia wilsonia (Ord)

Resident along the lower keys, its numbers augmented during the winter by migrants from the north.

The keys having sandy beaches, such as Boca Grande in the Key West Refuge and others from Key West to Big Pine Key, are its favorite haunts. On Boca Grande Key one bird whose tail seemed to be somewhat plucked flew on my approach, striking the water and then swimming to shore almost as well as a duck. Although I did not find any eggs this was probably due to their protective coloration, as pairs of birds at certain spots where I searched were greatly agitated.

KILLDEER

Oxyechus vociferus vociferus (Linnaeus)

A winter resident on the lower keys, my records being chiefly for the island of Key West, where it is abundant at times.

Birds from the north commence to arrive in October; an extremely early date is August 31, 1942, when one bird was seen in Key West. They remain well into February, but I have no March dates. On December 21, 1939, about 100 birds in all were noted on a Christmas Bird Census about Key West.

BLACK-BELLIED PLOVER

Squatarola squatarola (Linnaeus)

A common winter resident and migrant, a number of non-breeding birds staying throughout the summer.

They may be seen from Little Pine Key off Noname Key to the Marquesas Keys in the Key West Refuge. Owing to the numbers of nonbreeding birds, the dates of arrival and departure are hard to determine, but during October an increase in the population is noted, and on June 18, 1941, 10 were seen at the Marquesas Keys. This flock may or may not have been migrants. On October 12, 1940, 50 were counted on the Gulf side of Stock Island near Key West.

These birds are called "Christmas Plovers" by some of the natives.

On one occasion a Black-Bellied Plover, apparently injured and unable to fly, entered the water and swam on our approach, repeating this several times. This was in the Crane Key area.

RUDDY TURNSTONE

Arenaria interpres morinella (Linnaeus)

A common winter resident and migrant throughout the lower keys, a few nonbreeding birds being seen throughout the summer months. On August 18, 1940, twelve were observed on the Atlantic side of Key West. These may have been arrivals from the north.

Approachable and at times fearless, one of these little birds lit and stayed on our skiff which was tied to the larger boat where

we slept. The turnstone probably spent the night aboard, as long after dark I saw it, by flashlight, settled for the night.

WILSON'S SNIPE

Capella delicata (Ord)

I have only a few records for this species, as follows: October 30, 1939, one bird about the grassy radio range in Key West; January 9, 1940, one bird, probing, at the same location; and December 27, 1940, two at the same place. This range is a large, generally moist field at the West Martello Tower.

SPOTTED SANDPIPER

Actitis macularia (Linnaeus)

A spring and fall migrant and winter resident which has been recorded during every month except June. Birds from the north generally appear during July; a number remain all winter, and individuals have been recorded as late as May 29 (1940). Garrison Bight, Trumbo, and the docks about Key West are favorite resorts, but Spotted Sandpipers have been seen along the keys from No-name Key to Key West. Boca Grande Key in the Key West Refuge is a good place to find them, its beaches and general terrain being adapted to their needs.

EASTERN WILLET

Catoptrophorus semipalmatus semipalmatus (Gmelin)

This species, a permanent resident, may be seen along the main highway keys as well as on certain refuge keys as far west as the Marquesas. During migration and winter the population is increased, but it is almost impossible to give correct migration dates. Though the western form, *C. s. inornatus* (Brewster), is also known to be a migrant and winter resident, it is practically indistinguishable in the field from the eastern form, and its status is unknown.

The Gulf side of the Snipe Keys is a favorite place for willets. These birds are locally known as "Christmas Plovers," a name given also to the Black-bellied Plover.

GREATER YELLOW-LEGS

Totanus melanoleucus (Gmelin)

A common migrant and winter resident, although nonbreeding birds may be seen throughout the year. The ponds about Key West, Boca Chica Key, Sugarloaf Key, and certain other highway keys are favorite localities. It has been recorded also on Boca Grande Key and the Marquesas Keys of the Key West Refuge.

LESSER YELLOW-LEGS

Totanus flavipes (Gmelin)

A fairly common migrant and winter resident; some birds are seen throughout the year. The ponds about Key West are favorite resorts. Also recorded on Boca Grande Key of the Key West Refuge, as well as along the highway keys. One was heard to utter approximately 50 notes without stopping, then flew and shortly returned to the same pond—a customary habit.

PECTORAL SANDPIPER

Pisobia melanotos (Vieillot)

Only one record, March 17, 1942, for a single individual at a small pond on the island of Key West. Close and lengthy observations with 8-power glasses were made.

As Howell (*op. cit.*, p. 237) speaks of this species as "an uncommon migrant in spring, common in fall, occurring both on the coasts and in the interior," it may be assumed that future field studies will yield more records for the lower keys.

LEAST SANDPIPER

Pisobia minutilla (Vieillot)

This, the smallest of the sandpipers, is a spring and fall migrant as well as a winter resident among the lower keys. My earliest record is July 22 (1941), my latest April 25 (1939). Rest Beach on Key West, the sandy beaches of Boca Chica Key and Boca Grande Key are favorite locations. Here it mingles with its close relative, the Semipalmated Sandpiper, and at times with the Western Sandpiper, these three giving the bird student puzzling problems in identification.

RED-BACKED SANDPIPER

Pelidna alpina sakhalina (Vieillot)

At the time that the late Arthur H. Howell wrote (*op. cit.*, p. 241) this bird had apparently been unrecorded from Key West, although he mentions two specimens taken by Maynard on the Florida keys, November 15 and 22, 1870, and two or three near Sanibel Light recorded by Nichols on April 9, 1917.

Records are still meager; six near Snipe Keys in the Great White Heron Refuge seen by Harold Peters and me, March 10, 1939; two on Key West, October 31, 1939; six on Key West, January 11, 1942; and one on Boca Chica Key, February 16, 1942.

From these dates we may consider this bird an uncommon winter resident, although future studies may prove it to be more abundant than now appears.

EASTERN DOWITCHER

Limnodromus griseus griseus (Gmelin)

LONG-BILLED DOWITCHER

Limnodromus griseus scolopaceus (Say)

As these subspecies are impossible to tell apart in the field, I have not attempted to separate them in this account. Although both forms are known to occur along the keys, it is believed that the eastern form, *griseus*, is the more common one; collecting of specimens, however, is advisable.

Although the Dowitcher is chiefly a spring and fall migrant and an abundant winter resident, nonbreeding birds are seen throughout the summer; it is found in the Key West area, along the main highway keys, and in both refuges. On July 30, 1940, two individuals were recorded at the Tortugas Keys about 65 miles from Key West.

STILT SANDPIPER

Micropalama himantopus (Bonaparte)

The only record I have for this species is of one individual seen about one of the ponds on Key West, December 10, 1939. Guy Emerson of New York and I made a careful study of it at close range for several minutes.

As specimens have been taken at Key West in former years and the bird is known to be a spring and fall migrant through this area, it is safe to assume that future studies will reveal more of them.

SEMIPALMATED SANDPIPER

Ereunetes pusillus (Linnaeus)

Mingling with the flocks of Least and Western Sandpipers, or in bands comprised only of its own kind, this little sandpiper must be closely studied to differentiate it. While possibly not so abundant as the "Least," nevertheless flocks of the "Semipalmated" have been seen from about August 18 to April 25 on sandy beaches about Key West, on the main highway keys, on the Snipe Keys in the Great White Heron Refuge, and on Boca Grande Key of the Key West Refuge.

WESTERN SANDPIPER

Ereunetes maurii Cabanis

Definite records of this species, although not so numerous as for the "Semipalmated," show that it winters to some extent about Key West, and on others of the lower Florida keys, arriving from the north about August 18. One individual, probably a nonbreeder, was observed on June 25 (1942) on Boca Chica Key by William Anderson of Orlando and me. I have no spring dates.

SANDERLING

Crocethia alba (Pallas)

A fairly common spring and fall migrant and winter resident, arriving from the north about August 18. As about 55 birds were recorded on Boca Chica Key on May 30, 1939; and six were seen on the same key on June 10, 1942, it is believed that nonbreeders remain here to some extent. The island of Key West and Boca Chica Key are favorite haunts, where it mingles with other small shore birds.

BLACK-NECKED STILT

Himantopus mexicanus (Muller)

Records of this species are as follows: July 31, 1939, two birds; August 13, 1942, five; and August 26, 1942, five. All were feeding by ponds in Key West.

Although breeding in a number of locations in the State, no nests have been found along the keys, hence it is believed that the Stilts seen on Key West were fall migrants heading southward.

HERRING GULL

Larus argentatus smithsonianus Coues

A winter resident among the lower keys, recorded in every month except June, July, August, and September. October 4, 1940, is the earliest date of arrival noted, the species staying until late in April, although one bird which had become oil-soaked was observed on May 27, 1942.

It is common about the docks, piers, and ponds of Key West, and in many parts of the Great White Heron and Key West Refuges as far west as the Marquesas.

RING-BILLED GULL

Larus delawarensis Ord

Not nearly so common as the preceding species although wintering among the lower keys to a limited extent.

Howell (*op. cit.*, p. 258) states "the species has been recorded from Miami, but apparently not from the Florida keys, although it reaches Cuba and Mexico in its migrations." My records include four birds at the submarine base in Key West on February 18, 1939; one on a Calda Channel marker, off Key West, on January 24, 1941; and four included in a Christmas Bird Count for the Key West area, December 26, 1941.

LAUGHING GULL

Larus atricilla Linnaeus

A permanent resident among the lower keys and the most abundant member of the family, especially during the winter after large numbers arrive from the north. A count of 400 birds off Key West was made on January 21, 1942.

At one time they were known to breed at Key West and on other keys off the mainland, and although I failed to find any nests while stationed in the keys, I believe that they still reproduce somewhere in the area.

Under the heading of the Eastern Brown Pelican I have mentioned a Laughing Gull's riding on the back of a pelican.

GULL-BILLED TERN

Gelochelidon nilotica aranea (Wilson)

The only record I have of this bird is of one individual seen at a pond in Key West on April 29, 1941. This was studied at close range and under favorable conditions. I was previously familiar with the species, hence there is no doubt as to the identification.

COMMON TERN

Sterna hirundo hirundo Linnaeus

I have only one record of this species, for Garrison Bight, Key West, November 5, 1939. One bird was definitely identified and others farther off are believed to have been the same.

EASTERN SOOTY TERN

Sterna fuscata fuscata Linnaeus

Although thousands of these birds nest at the Tortugas, about 65 miles off Key West, my only records are of two that circled about our boat off Bay Keys in the Great White Heron Refuge, June 26, 1941. These were probably wanderers from the Tortugas colony.

LEAST TERN

Sterna antillarum antillarum (Lesson)

The arrival of this summer resident on the lower Florida keys is one of the best signs of springtime, as the increase in heat in this tropical clime is not nearly so noticeable as farther north.

As the Florida keys swing southwesterly from the mainland, various birds are observed along the upper keys and on the mainland before they are seen on Key West or in the lower keys. April 29 of the years 1941 and 1942 is the earliest date I have for the arrival of this species at Key West. A few birds come at first but their numbers gradually increase and nesting takes place on many of the lower keys. As I have no September record they apparently leave this area during the latter part of August.



Fig. 12.—“The Gannet” (formerly the “Scoter”). Fish and Wildlife Service patrol boat, at the Marquesas, Key West National Wildlife Refuge. C. W. Rosenbury aboard.
Photograph by Earle R. Greene.



Fig. 11.—House said to have been occupied by John James Audubon in 1832.
Corner of Whitehead and Greene Streets, Key West, Florida.
Photograph by Earle R. Greene.

Three hundred were counted on August 18 near the outer point of Snipe Keys in the Great White Heron Refuge, a number of them being in the winter adult plumage.

Eggs or young have been found on Key West, Stock Island, Sugarloaf Key, and on sandspits off Key West and Sand Key.

The species was very abundant during 1939, 1940, and 1941. However, during the spring and summer of 1942 Least Terns were noticeably lacking from many former choice localities, especially about Key West. This scarcity may have been caused by war activities, including dredging, bombing, and target practice in this area.

ROYAL TERN

Thalasseus maximus maximus (Boddaert)

Seen all the year along the lower Florida keys and throughout both refuges from Noname Key to the Marquesas, sometimes in groups on the sandy bars and always along the channel markers of the boat runs.

They are a beautiful and conspicuous feature of the bird life of the area. Although I found no eggs, Royal Terns doubtless nest in the region; Howell (*op. cit.*, p. 268) records eggs in the U. S. National Museum from Tortugas.

CASPIAN TERN

Hydroprogne caspia imperator (Coues)

A winter resident similar in appearance and habits to the Royal Tern, but not nearly so common.

My first date of arrival from the north is October 25, 1940, and the latest date in spring is April 11, 1940.

The greatest number seen at one time was 20 birds observed at the Marquesas Keys, the westerly extremity of the Key West Refuge, December 13, 1939.

BLACK TERN

Chlidonias nigra surinamensis (Gmelin)

A fall migrant, my earliest record in the Key West area being July 20, 1942, and my latest, September 5, 1939. During this period it becomes common, approximately 300 birds being counted about the Snipe Keys in the Great White Heron Refuge, August

4, 1939, and 250 about Rest Beach on the Atlantic side of Key West, August 20, 1940. Black Terns are also common about Calda Channel and Northwest Channel, on the Gulf side of Key West. Most of the birds seen were in the mottled or changing plumage. I have no spring records.

BLACK SKIMMER

Rynchops nigra nigra Linnaeus

I have only a few records for this interesting species but they seem to be the only ones for the lower keys. All were made in 1940. On January 25, ten were seen along Calda Channel on the Gulf side of Key West. On February 1, about 75 were seen by a pond on the island of Key West. On February 9, about 60 individuals were observed on the Atlantic side of Boca Chica Key, and on March 7 two were noted over Garrison Bight in Key West.

WHITE-CROWNED PIGEON

Columba leucocephala Linnaeus

This, the "white-headed pigeon" of Audubon, is one of the most interesting birds of the Florida keys, and one which delights the visiting ornithologist, as it only occasionally appears farther north on the mainland.

It was the object of persecution in former days, the nests being rifled and the eggs and young as well as the old birds taken by wreckers, fishermen, and spongers. This practice, as well as regular hunting of them, continued until recent years, but under Federal protection, a decided increase in the numbers of this species has been noted.

Wintering in Cuba and other West Indian islands, the White-crowned Pigeon reaches the lower Florida keys in early or mid-May, my records being for 1939, May 16; and for 1940 and 1941, May 10. Joe Warren, my boatman, recorded 10 at the Marquesas on April 18, 1941. Earl Sycks reported 20 birds on Stock Island adjoining Key West, May 9, 1942.

These Pigeons generally leave for the south during September. By the end of that month only a few remain to spend the winter. One was observed on Stock Island about the Botanical Garden in October, 1941, was reported there during the winter, and seen

in March and April, 1942. A bird observed in Key West, May 2, and 6, 1942 was also probably a wintering bird.

Nesting begins shortly after arrival, the birds using to a great extent the mangrove trees among the outer keys from which they must fly some distance to the main highway keys for food for themselves and their young. They do not do this, of course, where food can be procured nearby. A great many nests have been examined:

1939—June 26: On Riding Key, one of the Sawyer Key group, 1 nest about ten feet up made of small sticks and fairly well constructed containing 2 eggs; 1 nest about 12 feet up holding 2 eggs; 1 nest about 15 feet up with 1 egg (another egg on ground below on the verge of hatching, probably was knocked out of nest by adult bird leaving on our approach); 1 nest about 15 feet up containing 1 young bird, large and well-feathered. Nests were about 50 feet apart and of about the same general construction, of small sticks and better built than nests of mourning doves. July 11: On Wall Key, 5 nests, eggs in all (Warren). July 12: Snipe and Barracouta Keys, 10 nests, 6 small birds and eggs (Warren). July 13: Pigeon Key (in Great White Heron Refuge), 7 nests (Warren). July 14: Johnson Keys, 6 nests with eggs (Warren).

1940—June 13: On Riding Key, 1 nest near edge of key over the water containing 2 eggs. July 2: Hawk Key, 1 nest with 1 egg and 1 young bird. July 10: Big Pine Key Mango, 1 nest holding 2 eggs. July 11: On one key of the Upper Squashes, 1 nest of 2 young birds (Warren), 1 nest with 1 egg (Warren), and 1 with 2 eggs (Malone).

1941—June 26: Bay Keys, 2 nests each containing 2 eggs (Lopez). July 10: Bay Keys, one nest 12 feet up with 1 young bird with pin feathers; 1 nest containing 1 bird, almost grown.

1942—June 26: Bay Keys, 1 nest 14 feet up in mangrove containing 2 eggs (Anderson); July 14, this same nest held 1 immature, almost grown, which came off the nest to tree, then flew. Warren climbed up and reported 1 other small bird on nest. July 16: Hawk Key, 1 nest containing 2 young birds (Warren). Eaglenest Key, 2 nests with 2 young birds each (Warren).

Both male and female adults have been recorded incubating on the nests, which is a well known habit of this family of birds.

Among several favorite feeding areas in the lower keys, one is the Botanical Garden on Stock Island near Key West, where at times hundreds of adult birds gather to fill their crops and fly out to their young among the outer keys or those offshore from the highway keys. Although the so-called "highway keys" (those connected by bridges and the roadway from Key West to the mainland) are actually a chain of islands, a person living in the

keys comes to think of them more as an extension of the mainland than as a part of the true keys, and tends to contrast them with the dozens of mangrove keys farther out from them in the Gulf or Atlantic.

Principal foods obtained by the pigeons in the Botanical Garden are fruits of *Ficus aurea* (wild fig), *Cestrum diurnum* (day jessamine), *Eugenia* (stopper), *Elaphrium simaruba* (gumbo limbo), *Carissa grandiflora* (natal plum), *Malpighia*, *Sapota achras* (sapodilla), *Coccolobis floridana* (pigeon plum), *Coccolobis uvifera* (sea grape), *Phyllanthus acidus* (star gooseberry), and *Schinus terebinthifolius* (Brazilian pepper). Mr. Duncan, superintendent of the Overseas Highway and long a resident of the keys, states that these birds feed on the berries of the poison-wood (*Metopium toxiferum*), and that people who have eaten their flesh afterward have been badly affected.

On June 21, 1942, between 5:30 and 7:30 p.m., in company with a friend I counted 183 birds, leaving the trees about the Botanical Garden and flying out toward the keys in the Gulf. They were in singles, doubles, and in groups up to about 15 birds. About 41, either some of those that had previously gone out or new birds, or both, were counted coming in from outer keys to the Garden. However, the total count of 183 birds is probably very near the correct number of individuals seen at that time.

It would be hard to determine, even approximately, the number of White-crowned Pigeons occupying the Florida keys during the summer. A few counts, out of many taken on trips, may be of interest: June 27, 1939, 38 birds, Noname to Teakettle Keys; July 9, 1940, 37 from Hawk Key to Noname Key; July 11, 1940, 59 between Noname and Key West; April 18, 1941, 10 at the Marquesas Keys (Joe Warren). With few exceptions White-crowned Pigeons were recorded on every key in the Great White Heron Refuge and along the highway keys adjoining, as well as on several of the keys of the Key West Refuge.

The note of this bird is generally a four-noted "coo," not so soft as that of the Mourning Dove. At times the calls reminded me of some of those of the Barred Owl but were not so penetrating.

As thousands of these birds are shot every winter in Cuba by the natives as well as by visiting sportsmen, the number recorded in the Florida keys is gratifying indeed. They should have the fullest protection.

EASTERN MOURNING DOVE

Zenaidura macroura carolinensis (Linnaeus)

The Mourning Dove is a winter visitant and to some extent a permanent resident on the lower Florida keys, as a few birds may be seen in any month of the year. Two were observed on May 28, 1940, at the Marquesas Keys, the western extremity of the Key West Refuge.

I was unable to find any nests although diligent search was made, but the actions of certain birds observed led me to think that they were nesting.

Migrants from the north generally arrive early in October and become fairly common about Key West during November and December, diminishing in numbers in January and February. By March only a few birds remain. Favorite feeding areas include that part of Key West known as Trumbo Island, and the area about West Martello Tower where Mr. Demeritt has been so successful in banding them for some years and where the writer counted 150 birds on November 20, 1940.

As the Mourning Dove is about the only game bird available to hunters of the keys, shooting on the island of Key West was quite a problem, owing to the growing number of inhabitants and to intensification of hunting in that area because few birds were available to the sportsman farther up the keys. A scarcity of these birds during the winter of 1941-42 was very noticeable. This, coupled with the taking over of much of the island by the Navy, destroying good feeding areas, will probably result in continued scarcity.

A few Mourning Doves have been found on some of the keys of the Great White Heron Refuge, as well as occasionally on the higher and dryer islands of the Key West Refuge as far as the Marquesas.

EASTERN WHITE-WINGED DOVE

Melopelia asiatica asiatica (Linnaeus)

On May 19, 1940, I had an excellent opportunity of observing one of these birds at close range—my only record. This was near the Inn on Big Pine Key, the bird being observed on the ground, in flight, and also in one of the trees nearby. Mr. Demeritt, a lifelong resident of Key West and a good bird observer,

tells me that he has found birds of this species occasionally among flocks of Mourning Doves.

EASTERN GROUND DOVE

Columbigallina passerina passerina (Linnaeus)

A permanent resident of the keys, observed several times on Boca Grande Key in the Key West Refuge, although not common among the outer keys of either refuge. Fairly common along the highway keys from Big Pine to Key West.

A nest found June 25, 1939, by Joe Warren and shown to me, was located on the golf course on Stock Island. It was on the ground, composed of grass and straw, and contained 2 eggs.

The local name is "tobacco dove."

MAYNARD'S CUCKOO

Coccyzus minor maynardi Ridgway

This interesting but shy bird is not very common along the lower keys. All of my records except one were made on Sugarloaf Key, about 20 miles northeasterly from Key West, in May, June, and August of 1939, and June and August of 1940. On June 24, 1941, a dead bird, which had apparently been killed by a car on the highway, was examined on Cudjoe Key.

As it is a summer resident and known to breed throughout the area, its secretive habits may account for the paucity of records.

Its notes sound somewhat like those of the Yellow-billed Cuckoo but enough different to be recognized.

YELLOW-BILLED CUCKOO

Coccyzus americanus americanus (Linnaeus)

This summer resident is fairly common on the lower keys, especially on Key West, Stock Island, and Sugarloaf Key, and was recorded several times on Boca Grande Key of the Key West Refuge.

Owing to its secretive habits, it is hardly known to the natives, although it is much more common than the preceding species. No nests have been found by the writer, but immature birds have been seen. My records represent the months of May through September.

SMOOTH-BILLED ANI

Crotophaga ani Linnaeus

My first acquaintance with this bird was on July 4, 1939, when one was discovered near my home in Key West. At first glance one might deem it a grackle, but its long tail, slow and somewhat clumsy flight, stubby looking bill, and whining notes soon dispel that idea.

My records are for July and August 1939, August 1940, July 1941, and June and July of 1942, generally of single individuals but of two birds on August 6, 1939, and two on June 26, 1942.

Diligent search was made for a nest but without success, and the bird's comings and goings were a mystery to me.

Its notes are rather musical in tone and not at all like those of a Florida Grackle. At times they are loud and repeated, reminding me somewhat of certain notes of the Willet, and are uttered on the wing as well as when perched. It also has a whining note, as well as another that might be expressed as "whew-whew." They seemed to put up a poor fight against aggression by the grackles. In Cuba they are called "Jew birds," and are very common.

BARN OWL

Tyto alba pratincola (Bonaparte)

All of the records I have for this species are of dead birds, as follows: remains of two by the Overseas Highway on Sugarloaf Key, November 22, 1939, apparently killed by cars while the birds were feeding on or close to the ground; one bird on the highway on Cudjoe Key on December 6, 1940, probably killed by a car; and one on highway near Bird Key Bridge brought to me, February 11, 1942, by Joe Warren. I also had a report of a "monkey-faced owl" found dead on Trumbo Island, a part of Key West. The species is probably more common than is indicated by these records, but escaped notice because of its nocturnal habits.

CHUCK-WILL'S-WIDOW

Antrostomus carolinensis (Gmelin)

My records for this species in March, April, and September show it to be a spring and fall migrant in the lower keys. It may winter in the keys, but I have no records.

Birds were seen on Bay Keys of the Great White Heron Refuge in March, 1939 and April, 1942. One individual, apparently a female or young in first winter plumage, was flushed twice in September, 1941 from the ground or a low perch by the side of my home in Key West, the last time uttering two "chuck" notes as it flew away. On September 9, 1941, a dead bird was found on the highway on Boca Chica Key. In September, 1941 as well as September, 1942, Chuck-will's-widows were seen in the dense growth of the Botanical Garden on Stock Island.

EASTERN NIGHTHAWK

Chordeiles minor minor (Forster)

FLORIDA NIGHTHAWK

Chordeiles minor chapmani Coues

CUBAN NIGHTHAWK

Chordeiles minor gundlachii Lawrence

In treating the Nighthawks of the lower Florida keys, three subspecies must be considered. I am listing them together as considerable collecting would be necessary to obtain migration and nesting data for the separate races.

Until June of 1941, when Roger Tory Peterson called my attention to the notes of birds over Key West, I had presumed that the migrating Night-hawks were of the eastern form, *minor*, and the summer resident birds, the Florida form, *chapmani*. He suggested to me the possibility of a West Indian race breeding on the keys. This was verified when two birds collected on Boca Chica Key, August 11, 1942, were identified by John W. Aldrich, biologist of the Fish and Wildlife Service, as *C. m. gundlachii*, one a female in the gray phase and the other an immature male.⁷

The call notes of this Cuban race are different from those of the Eastern and Florida Nighthawks, consisting of three or four notes expressed as "killy kadick" by Cubans living along the keys and also thus stated by James Bond in his "Birds of the West Indies." Although no nests or eggs were found by the

⁷Greene, Earle, R. 1943. Cuban Nighthawk breeding on the Lower Florida Keys. *The Auk*, 60 (1):105.

writer, it is believed this is the breeding form of the lower keys, but with the possibility of *chapmani* breeding there also.

Referring to Nighthawks as a group, I have seen no large concentrations. On September 3, 1939, about 21 were counted from Sugarloaf Key to Key West; September 7, 1941, about 21 birds were noted flying over Trumbo Island, a part of Key West, these close together and not feeding and therefore probably were migrants *en route*; August 31, 1942, about 12 birds at the Atlantic Ocean side of Key West, apparently migrants. The spring migration appears poorly determined. April 19, 1942, is my earliest date and September 16, 1941, the latest date recorded.

CHIMNEY SWIFT

Chaetura pelagica (Linnaeus)

This bird, so abundant during migrations especially, in many parts of the south, appears to shun the Florida keys to a large degree. My only records are of 2 birds on April 20, 1940, 1 the next day, and 1 on April 12, 1942, all at Key West. The Swift apparently does not nest along the keys; possibly the scarcity of chimneys has something to do with this, as Howell (*op. cit.*, p. 301) mentions it as "a locally common summer resident over the greater part of Florida as far south as Homestead," which is on the mainland.

Considerable banding of Swifts has been done within the last few years in many parts of the country, which throws much light on their habits and migration routes. However, more such study is needed to establish more clearly the facts regarding their concentrations and migrations.

RUBY-THROATED HUMMINGBIRD

Archilochus colubris (Linnaeus)

A fairly common spring and fall migrant and a winter resident on the lower keys. My records are for Key West, Stock Island, and Big Pine Key. The earliest date of arrival from the north noted is October 1, 1940, and latest date the species has been seen in spring is May 3, 1940.

Favorite feeding places were about the hibiscus and "turk's cap" in my yard in Key West, and about the flowering shrubs and trees of the Botanical Garden on Stock Island.

EASTERN BELTED KINGFISHER

Megasceryle alcyon alcyon (Linnaeus)

This bird is an abundant winter visitant throughout the lower keys, including both refuges as far west as the Marquesas. An early arrival was noted on August 9, 1942, on a wire by the highway bridge between Stock Island and Boca Chica Key. The latest bird in the spring was noted May 16, 1939, on Boca Chica Key.

SOUTHERN FLICKER

Colaptes auratus auratus (Linnaeus)

Although I was unable to find this species on the lower keys, records show that in former days it was known as far down as Key West, though rarely. Future work may again reveal its occurrence there. My records are for a bird in Tavernier on Key Largo, June 25, 1940, and another near the same place, October 9, 1941. This key, near the mainland, is large and heavily wooded in spots, providing an ideal area for nesting.

FLORIDA PILEATED WOODPECKER

Ceophloeus pileatus floridanus (Ridgway)

This bird also has not been recorded by me on the lower Florida keys, but as I have two records from Key Largo, I am including them in this list for the benefit of future workers. On August 27, 1939, I heard a bird calling near the Anglers' Club on Key Largo, and on May 6, 1940, one was distinctly seen flying from the same direction. This may be the most southern record of the species in Florida. A search of this key might reveal one or more nests.

Although the late Arthur H. Howell did not recognize the Florida form as separable from the more northern bird, *C. p. pileatus* (Linnaeus), I employ the name in accordance with my policy of following the AOU checklist.

RED-BELLIED WOODPECKER

Centurus carolinus (Linnaeus)

This is the only member of its family that may be considered fairly common in the lower keys, where it is a permanent resident. My records are for Friends Key off Noname Key, Big Pine,

Sugarloaf, Geigers, Torch, and Boca Chica Keys, Stock Island, and Key West, as well as for the Bay Keys in the Great White Heron Refuge. One nesting hole in use was found on Geigers Key in a dead coconut palm tree about 20 feet from the ground and about 3 feet from the broken off top. Adult birds were seen there a number of times during June, 1942, going in and out of the hole.

YELLOW-BELLIED SAPSUCKER

Sphyrapicus varius varius (Linnaeus)

Apparently a rather rare winter visitant along the lower keys. My records, all of single birds, are: April 19, 1939, Boca Chica Key; November 1, 1939, Key West; December 1, 1941, Boca Chica Key; December 15, 1941, Key West; and December 26, 1941, Key West.

It is interesting to note that the bird seen in Key West on December 15, was about the trees around the old house on the corner of Whitehead and Greene Streets said to have been occupied by John James Audubon during his visit here.

EASTERN KINGBIRD

Tyrannus tyrannus (Linnaeus)

Although nesting on the mainland, where I have seen young birds with their parents along the Tamiami Trail near Coral Gables, in the keys this species seems to be only a spring and fall migrant. Kingbirds arrive from the south during the latter part of March, my earliest date being a bird on Summerland Key, March 24, 1939. For about a month birds may be seen, my latest date in the spring being April 22, 1940 for two birds in Key West.

For the fall migration, when they are more abundant, my earliest date is August 19, 1940, on which date an Eastern Kingbird in immature plumage was noted in Key West. During the latter part of August and throughout September they were common about Key West, Stock Island, Sugarloaf Key and other choice feeding areas, where flocks of from 20 to 40 were seen. As a rule, they disappeared by the end of September although I recorded one individual on Upper Matecumbe Key, October 9, 1941.

GRAY KINGBIRD

Tyrannus dominicensis dominicensis (Gmelin)

An abundant and typical summer resident along the highway keys and also among those of both the Great White Heron and Key West Refuges, being common as far westwardly as the Marquesas.

Dates of arrival from the south varied from late March to early April, my earliest date being March 22, 1942, when three were noted about the Botanical Garden on Stock Island.

The latest fall date is October 10, 1940, when three were seen on Stock Island.

As many as 32 birds, some appearing to be family groups, were recorded in a few hours from Stock Island to Sugarloaf Key on August 21, 1942.

Nesting records follow: June 24, 1939, a nest at Pirates Cove on Sugarloaf Key, about 15 feet up and near the top of a mangrove tree by the water's edge; actions of the adults denoted the presence of young birds. July 10, 1941, a frail nest, chiefly of seaweed, about 8 feet above high water in a red mangrove, on one of the Bay Keys, containing two young in the pin-feather stage; July 11, 1942, a nest at Pirates Cove on Sugarloaf Key, about 20 feet up at the end of a mangrove branch, very frail and apparently made chiefly of straws, hard to reach so the interior was not examined.

Local names for the Gray Kingbird are "fighter" and "hardhead."

ARKANSAS KINGBIRD

Tyrannus verticalis Say

This straggler from the west is of frequent occurrence and may be classed as a regular winter visitant to the Florida keys.

My earliest date of arrival is October 13, 1940, for 4 birds seen in Key West. From 1 to 6 birds have been recorded in Key West in November, December, January, February, and March. April 1, 1939 is the last date for Arkansas Kingbirds in spring. They are frequently in the company of the next species. Key West being the terminus, so to speak, of the keys route, is the final gathering place of a number of such species for the winter.

My records include birds near the Seven Mile Bridge, Cudjoe Key, Key West, and one on Boca Grande Key in the Key West Refuge.

SCISSOR-TAILED FLYCATCHER

Muscivora forficata (Gmelin)

This is another so-called straggler from the west that is even more common than the Arkansas Kingbird in winter, and is naturally a delightful "find" for visiting bird students.

My earliest date of arrival is October 20, 1940, when one bird was seen near the post office in Key West; the wires along the street there were later found to be a favorite resort for this species, members of which, as a rule, flock together while here.

This species has also been recorded in November, December, January, February, March, April, and early May, my latest record being for May 2, 1942. All of my records are for Key West. On December 19, 1941, 15 birds were counted, most of them about a pasture near Fort Taylor, where it was their custom to congregate to catch the many insects present.

SOUTHERN CRESTED FLYCATCHER

Myiarchus crinitus crinitus (Linnaeus)

My records of this species are few, as follows: on May 26, 1939, 1 bird seen and heard calling, on Saddlebunch Key; April 4, 1942, 2 birds at Marathon; and April 11, 1942, 1 in Key West.

While specimens are lacking, these records are referred to the southern race instead of to the northern form *boreus*, although that form may also occur during migration. According to Howell in "Florida Bird Life," the northern race breeds in the northwestern portion of the State and the southern race throughout the balance of the mainland. I located no nesting birds on the keys.

EASTERN PHOEBE

Sayornis phoebe (Latham)

An uncommon winter visitant along the keys. Recorded in November, December, January, and February. Records are for Key Largo on the upper keys, Noname Key, Big Pine Key, Sugarloaf Key, and Key West.

EASTERN WOOD PEWEE

Myiochanes virens (Linnaeus)

A fairly common migrant in spring and fall. Extreme dates in spring are April 12, 1942, and April 23, 1940 and in fall, August 30, 1942 and September 19, 1941. Only one or two were seen at a time. Boca Chica Key, Stock Island, and Key West were the only localities of record.

TREE SWALLOW

Iridoprocne bicolor (Vieillot)

A fairly common spring and fall migrant along the lower Florida keys, although a few may winter.

Arthur H. Howell (*op. cit.*, p. 328) states that this species is "an abundant winter resident in all but the northwestern part" of Florida. As the Florida keys, however, differ in many respects from the mainland, it is not uncommon to find the birds and their habits quite different.

All of my records for Tree Swallows in the spring are for March, from the 4th through the 25th, and in the fall for November, from the 18th through the 27th. They were seen on Noname Key, Little Torch Key, Boca Chica Key, and Key West.

BANK SWALLOW

Riparia riparia riparia (Linnaeus)

An uncommon but fairly regular fall migrant and a rare spring migrant; mostly seen singly and in pairs with other swallows. August 24, 1939, is my earliest date of fall arrival, and September 20, 1939, my latest. My only spring record is for April 23, 1940, 1 on Key West.

ROUGH-WINGED SWALLOW

Stelgidopteryx ruficollis serripennis (Audubon)

The only record I have of this species is of one bird at Key West, April 22, 1939. It is apparent that this swallow, so abundant in many parts of the eastern states, shuns the Florida keys.

BARN SWALLOW

Hirundo erythrogaster Boddaert

This is by far the most abundant swallow along the keys during the spring and fall migrations. There are also some

unusual records for other periods, as the bird has been recorded during every month except January, February, and March.

First arrivals from the south were noted on April 9, 1941, 6 birds at Key West. They are fairly common in May and June. On July 3, 1941, 1 bird was recorded in Key West; 1 was noted by the Bahia Honda Bridge near Big Pine Key on July 21, 1941; and another, July 7, 1942, on Summerland Key. These were probably early fall migrants.

Barn Swallows are common about many of the keys in August, September, October, and November, and I have records of an individual bird on Stock Island, December 1, and 3, 1941. In the Key West Refuge they may be seen about Boca Grande Key and the Marquesas, and occasionally about a few of the keys in the Great White Heron Refuge.

NORTHERN CLIFF SWALLOW

Petrochelidon albifrons albifrons (Rafinesque)

Apparently very rare, as I have only one record for a solitary bird seen about Boca Grande Key in the Key West Refuge on October 16, 1940.

PURPLE MARTIN

Progne subis subis (Linnaeus)

Fairly common during the spring migration and more abundant in the fall. On March 27 and 29, 1942, and on April 14 and 19, 1940, birds were seen in Key West.

On July 3, 1941, 2 individuals, apparently immature, were observed perched on wires in Key West, the previous night having been stormy and rainy; on July 19, 1939, one was seen on the upper keys near Tavernier and 2 on Lower Matecumbe Key; on July 20, 1942, 4 were seen flying off Boca Grande Key in the Key West Refuge. As a rule, Martins are common during August and September. I have one date in October, namely, the 7th, 1941, when one was seen at Boca Grande Key in the Key West Refuge.

As Purple Martins are known to breed on the mainland as near as Homestead, Florida, it would not be surprising to find them nesting on some of the lower keys if gourds or boxes were erected to encourage them.

FISH CROW

Corvus ossifragus Wilson

Occasionally seen about some of the keys of the Great White Heron Refuge, as well as about Key West and Stock Island.

On April 11 and 12, 1940, one was noted about a small key between Torch and Raccoon Keys in the refuge and it is believed that the eggshells found on the ground and bushes, apparently of herons, resulted from its depredations. In addition, one was also seen on the 12th about Scott's Key some distance away.

Two birds, and sometimes three, were frequently observed about the Botanical Garden and golf course on Stock Island near Key West. On June 6, 1941, a nest was found which was about 20 feet above ground in a tree by the golf course. Although it was empty on that date, I was told later that it contained 2 eggs about May 15. This species may be considered an uncommon resident.

FLORIDA WREN

Thryothorus ludovicianus miamensis Ridgway

On October 24, 1940, one of these birds was seen, and heard scolding, about a trash pile in the backyard of my home in Key West. It was an agreeable surprise to have a visit from this old acquaintance in what appears to be a "farthest south" record, as Howell (*op. cit.*, p. 351) notes this race as occurring "as far south as Key Largo," which lies just off the mainland of Florida.

EASTERN MOCKINGBIRD

Mimus polyglottos polyglottos (Linnaeus)

A permanent resident along the lower keys to Key West. Also recorded on Water Key in the Great White Heron Refuge in November, on the Marquesas Keys in December, and on Boca Grande Key in February, these last two localities being in the Key West Refuge. My observations show it to be more common on Key Largo, just off the mainland, than farther south. A nest was examined on Sugarloaf Key on June 4, 1939, which contained 2 eggs.

CATBIRD

Dumetella carolinensis (Linnaeus)

A winter resident and migrant in the lower keys. I have a record of one bird near Tavernier Creek near Key Largo of the upper keys on October 13, 1941. Two birds on October 26, 1941, in Key West represent the earliest date of arrival there, and two on May 9, 1942, at the Botanical Garden on Stock Island furnish my latest date.

Records taken in Harbor, Bay, and Mud Keys of the Great White Heron Refuge show it to be fairly common among the outer keys during the winter.

EASTERN ROBIN

Turdus migratorius migratorius Linnaeus

SOUTHERN ROBIN

Turdus migratorius achrusterus (Batchelder)

I have not attempted to separate these races in the field. The Robin has apparently been rare in recent years. My records are of 15 birds in the Botanical Garden on Stock Island on February 22, 1939, and of 6 in Key West on January 14, 1940.

WOOD THRUSH

Hylocichla mustelina (Gmelin)

Apparently a rare migrant. My only records are of one bird near my home in Key West, April 20, 1940, and one, possibly the same individual, at the same location on the 22nd.

GRAY-CHEEKED THRUSH

Hylocichla minima aliciae (Baird)

A rare migrant along the lower keys. On May 1, 1939, one was seen on the ground and about low perches near my home in Key West. On May 9, 1941, two were observed in the Botanical Garden on Stock Island. The possibility of their being Bicknell's Thrush, *H. m. minima*, is to be considered.

On May 12, 1941, a dead bird was brought to my home by our patrolman, Joe E. Warren, which he had picked up in Key West. This was identified by Dr. Harry C. Oberholser as *H. m. aliciae*.